

WHAT IS CLAIMED IS:

1. A method for performing annuloplasty, the method comprising:  
accessing a left ventricle of a heart to provide a plication element to the left  
5 ventricle; and  
engaging the plication element to tissue near a mitral valve of the heart, wherein  
engaging the plication element includes causing the plication element to gather a portion  
of the tissue to create a plication.
- 10 2. A method as recited in claim 1 wherein accessing the left ventricle of the heart to  
provide the plication element includes accessing the left ventricle of the heart with a  
catheter arrangement.
3. A method as recited in claim 2 wherein accessing the left ventricle of the heart  
15 using the catheter arrangement includes inserting the catheter arrangement into the left  
ventricle between a plane defined by the mitral valve and a plane associated with  
papillary muscles of the heart.
4. A method as recited in claim 2 wherein engaging the plication element to tissue  
20 near the mitral valve includes:  
piercing the tissue using the plication element, wherein piercing the tissue using  
the plication element causes a first portion of the plication element to be positioned on an  
atrial side of the mitral valve and a second portion of the plication element to be  
positioned on a ventricular side of the mitral valve.
- 25 5. A method as recited in claim 4 wherein the catheter is configured to cause the first  
portion of the plication element to be positioned on the atrial side of the mitral valve.
6. A method as recited in claim 1 wherein the plication element includes a first bar  
30 element and a second bar element, the first bar element and the second bar element being

coupled to a thread, the thread further being coupled to a locking mechanism, and wherein engaging the plication element to tissue near the mitral valve includes:

inserting the first bar element and the second bar element through the tissue to an atrial side of the mitral valve; and

5 positioning the locking mechanism against the tissue on a ventricular side of the mitral valve, wherein positioning the locking mechanism against the tissue causes the plication to be formed substantially between the first bar element, the second bar element, and the locking mechanism.

10 7. A method as recited in claim 6 wherein the locking mechanism includes a pledget.

8. A method as recited in claim 6 wherein the locking mechanism includes a spring element, the spring element being arranged to cause the locking mechanism to engage, wherein when the locking mechanism engages, the first bar element and the second bar  
15 element are brought into contact with the tissue.

9. A method as recited in claim 6 wherein accessing the left ventricle of the heart to provide the plication element includes accessing the left ventricle of the heart using a catheter arrangement, the catheter arrangement being configured to introduce the first bar  
20 element and the second bar element through the tissue to an atrial side of the mitral valve and to position the locking mechanism against the tissue on the ventricular side of the mitral valve.

10. A method as recited in claim 1 wherein engaging the plication element to tissue  
25 near the mitral valve to cause the plication element to gather the portion of the tissue to create the plication includes gathering the portion of the tissue on a ventricular side of the mitral valve

11. A method as recited in claim 1 wherein the plication element is one selected from  
30 the group consisting of a suture structure and a clip.

12. A method for performing an annuloplasty, comprising:  
accessing tissue located near the mitral valve of a heart; and  
creating a first discrete plication in the tissue using a first plication element, the  
first discrete plication being positioned to cause an arc length of the mitral valve to be  
5 reduced.
13. A method as recited in claim 12 wherein accessing the tissue includes accessing  
the tissue through a left ventricle of the heart
- 10 14. A method as recited in claim 13 wherein the tissue is accessed through the left  
ventricle of the heart using a catheter.
15. A method as recited in claim 14 further including providing the first plication  
element through the catheter.
- 15 16. A method as recited in claim 15 wherein the catheter is configured to cause the  
first plication element to create the first discrete plication.
17. A method as recited in claim 15 wherein creating the first discrete plication in the  
20 tissue using the first plication element includes creating the first discrete plication in the  
tissue using the first plication element and the catheter.
18. A method as recited in claim 17 wherein the first plication element is a clip  
element, and creating the first discrete plication in the tissue using the first plication  
25 element and the catheter includes engaging the tissue using the clip element.
19. A method as recited in claim 17 wherein the first plication element is a locking  
element, the locking element including a first piece and a second piece, and creating the  
first discrete plication in the tissue using the first plication element and the catheter  
30 includes:

penetrating the tissue with a part of the first piece and a part of the second piece;  
and  
engaging the tissue between the first piece and the second piece of the locking  
element.

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20. A method as recited in claim 17 wherein the first plication element includes a plurality of bar pieces, a thread, and a lock, the bar pieces and the lock being coupled to the thread, and creating the first discrete plication in the tissue using the first plication element and the catheter includes:

10 penetrating the tissue to position the bar pieces on an atrial side of the tissue;  
tensioning the thread to position the bar pieces against the atrial side of the tissue;  
locking the lock against a ventricular side of the tissue, wherein locking the lock against the ventricular side of the tissue causes the first discrete plication to be formed substantially between the bar pieces and the lock.

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21. A method as recited in claim 12 further including:  
creating a second discrete plication in the tissue using a second plication element, the second plication element being substantially separate from the first plication element.

20 22. A system for use in an annuloplasty procedure, the system comprising:  
a catheter assembly configured for insertion through an aorta of the heart into a left ventricle of the heart to reach a region of the left ventricle substantially below the mitral valve; and

25 a bendable member, wherein the bendable member is movable between a first position for insertion into a left ventricle through the catheter assembly and a second position, the bendable member being configured to create a plication in tissue located near a mitral valve when the bendable member is in the second position.

23. A system according to claim 22 wherein the first position is a collapsed position  
30 and the second position is an extended position.

24. A system according to claim 22 wherein the first position is an open position and the second position is a closed position.

5 25. A system for use in an annuloplasty procedure, the system comprising:  
a catheter assembly configured for insertion through an aorta of the heart into a left ventricle of the heart to reach a region of the left ventricle substantially below the mitral valve; and  
a suture structure comprising a first bar member, a second bar member, a thread,  
10 and a locking element, the first bar member and the second bar member being coupled to the thread, the locking element being arranged to move over the thread, the catheter assembly being configured to cause the first bar member and the second bar member to penetrate tissue near the mitral valve, the catheter assembly further being configured to move the locking element over the thread into contact with the tissue on a ventricular side  
15 of the mitral valve, wherein a plication is created in the tissue substantially between the first bar member, the second bar member, and the locking element.

26. A system for performing annuloplasty on a mitral valve of a heart, the system comprising:

20 a catheter assembly configured for insertion through an aorta of the heart into a left ventricle of the heart to reach a region of the left ventricle substantially below the mitral valve;  
a guide element shaped for insertion into the catheter assembly, the guide element having an anchorable feature; and  
25 a plication element, the plication element being shaped for insertion over the guide element into the left ventricle substantially below the mitral valve, wherein the plication element is configured to gather tissue of the heart to create a plication in the tissue.

27. A system according to claim 26 wherein the plication element is a suture element, the suture element being configured to create a suture in the tissue to create the plication.

28. A system according to claim 26 wherein the plication element is a clip element,  
5 the clip element being configured to bunch the tissue to create the plication.

29. A system according to claim 26 wherein the catheter assembly includes a delivery tube and a gutter catheter, the gutter catheter being positioned at least partially within the delivery tube, wherein a portion of the gutter catheter is configured to be positioned  
10 substantially within a region of the left ventricle defined between a plane associated with the papillary muscles of the left ventricle and a plane associated with the mitral valve.

30. A system according to claim 29 wherein the guide element is shaped for insertion into a lumen of the gutter catheter.

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31. A system according to claim 28 wherein the catheter assembly includes a delivery tube and a gutter catheter, the gutter catheter being positioned at least partially within the delivery tube, wherein a portion of the gutter catheter is configured to be positioned substantially within a region of the left ventricle defined between a plane associated with  
20 the papillary muscles of the left ventricle, a plane associated with the mitral valve, cordae tendonae of the left ventricle, and a wall of the left ventricle.

32. A method for performing annuloplasty on a mitral valve of a heart, the method comprising:

25 inserting a first catheter assembly into a left ventricle through an aorta of the heart and an aortic valve of the heart;

positioning a guide element along a wall of the left ventricle beneath the mitral valve using the first catheter assembly;

30 positioning a plication element in the left ventricle beneath the mitral valve using a second catheter assembly and the guide element as a guide; and

engaging the plication element with tissue near the mitral valve using the second catheter assembly, wherein engaging the plication element with the tissue near the mitral valve creates a plication in the tissue.

5 33. A method as recited in claim 32 wherein the first catheter assembly includes a first catheter and a second catheter, the second catheter being located at least partially within the first catheter, the first catheter being arranged to facilitate the positioning of the second catheter along the wall of the left ventricle, and wherein positioning the guide  
10 element along the wall includes:

inserting the guide element through the second catheter; and  
anchoring the guide element against the wall.

34. A method as recited in claim 32 wherein initially positioning the plication element in the left ventricle beneath the mitral valve using the guide element includes:

15 inserting at least one expandable element into the left ventricle; and  
expanding the expandable element, wherein expanding the expandable element positions the second catheter assembly generally against the tissue near the mitral valve.

35. A method as recited in claim 32 wherein the plication element with the tissue near  
20 the mitral valve includes at least partially penetrating the tissue with the plication element to create the plication.

36. A method for performing annuloplasty, the method comprising:

inserting at least one plication element into a left ventricle of a heart; and  
25 engaging said at least one plication element to tissue near a mitral valve of the heart such that the plication element gathers a portion of the tissue to create a plication in the tissue near the mitral valve.